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THE ASSAY, CHARACTERISTICS, COMPOSITION, AND ORIGIN OF OPIUM

The forms of Crystals in Turkish Opium

The Secretary-General has the honour to publish the following article on the forms of crystals in Turkish opium by Dr. Alâeddin Akçasu which has been contributed by Professor Sedat Tavat, Director of the Institute of Pharmacology, Istanbul University.

This article is a slightly revised edition of one which appeared in the Bulletin of the Faculty of Medicine, Istanbul University, 1950, Vol. 30, No. 3.

THE FORMS OF CRYSTALS IN TURKISH OPIUM

By

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1. Many physical and chemical methods have been proposed for ascertaining the sources of illicit opium.

2. The papers by Charles C. Fulton, submitted to the third session of the Commission on Narcotic Drugs, in 1948, by the representative of the United States of America,[1] referred to the possibility of determining the origin of opium by examining its crystals, and proposed a method. A minute quantity of opium is crushed into an emulsion with a little water on a slide, smeared carefully and left to dry. It is then examined through a polarizing microscope magnifying 80 to 90 times. A 10 per cent solution of NaOH can be added to remove the resins contained in the opium. There is, however, no important difference between the crystals in preparations from which the resin has been removed and in those from which it has not. For this reason either method may be used for examining opium crystals. The examination of various kinds of opium by these methods showed that they contain more crystals than had previously been supposed. Finally, a special method[2] disclosed that the crystals consist of narcotine.

3. Fulton classified opiums according to the forms of these crystals into three groups:[3]

(a) The opium highly crystalline, containing crystals in the form of rods, In this group the field contains chiefly slender, well-formed rods of varying length. This group includes opium from India, China, Korea, and some from Iran.

(b) Instead of slender, well-formed rods this group contains small birefringent particles of varying size. It is represented by opium from Turkey and Yugoslavia.

1/ Document E/CN.7/117, 14 April 1948.

2/ Ibid., part II A, "On determining the Country of Origin of Opium".

3/ Ibid., part II A; also part II C, "Photomicrographs of Opium Crystals".

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/(c) An

(c) An intermediate group, divided into three sub-groups:

(i) Approaching group (a) but conspicuous rods are thicker and fewer, and most of the birefringent material consistsof tiny rods and irregular particles.
Afghan and some kinds of Iranian opium belong to this group.

(ii) Definitely intermediate: A rew rods are noticeable among many irregular particles over the whole field.
This sub-group includes opium from Mexico, Gwalior and Mongolia, and some from Afghanistan.

(iii) A type resembling the second group: the rods are imbedded in the resin and are not well-formed, and the crystals dispersed by the treatment are small irregular particles or fragments.
Japanese opium belongs to this sub-group.

4. In order to obtain a more exact knowledge of the crystal forms of opiums cultivated in Turkey, we obtained 10-gramme samples of opium from the 1948 crop of the chief opium-producing districts of Turkey.[1/] From these samples we made our preparations. A small quantity of opium was thoroughly crushed on a slide with a few drops of water and the undissolved part removed with the point of a knife. The remaining material is evenly smeared and left to dry. We did not use NaOH solution. We studied these preparations through a microscope enlarging eighty times and took the photographs with E. Leitz Wetzler microphotography apparatus at a magnification of 160 times with a distance of 25 cm. to the ocular.

5. The 14 samples which we examined included some from the districts of Aydin (Figure 1), Acipayam (Figure 2), Çorum (Figure 3), Inegöl (Figure 4), and Akhisar (Figure 5). These have crystals characteristic of the type which Fulton describes as contained in opium grown in Turkey. In these preparations the whole field is covered with irregular birefringent particles of varying sizes, and no rods are seen.

6. In the Aydin opium the birefringent particles are larger than in the other samples. A very few fine dust-like particles can be made out among them.

1/ We obtained our specimens through the Beşiktaş depot by permission of the Department of Agriculture. We desire to thank them both for their valuable and ungrudging assistance.

/7. In the Akhisar

7. In the Akhisar opium large crystals are relatively few, crystals in the form of fine granules predominating in the field.

8. The samples from Acipayam and Inegöl contain crystals of all sizes in equal numbers. In the Inegöl sample, however, separate large crystals with irregular margins were encountered here and there.

9. The crystals of the samples coming from the districts of Sandikli (Figure 6), Zile (Figure 7), Kula (Figure 8) and Uşak (Figure 9) do not conform to the type said to be characteristic of Turkey. They are somewhat similar to Fulton's first type, but an obvious difference is that whereas the crystals of Fulton's first type are in the form of rods with thick, blunt tips, the crystals visible in Figures 6, 7, 8, and 9 appear to be of another type - very fine, sharp-pointed, needle-shaped, and longer.

10. There are also some minor differences between these four samples. For example, in the Uşak opium needle-shaped crystals are in the majority, while in the Sandikli opium they are fewer than the small crystals. In the Zile sample the two kinds are present in more or less equal numbers. In the opium from Kula the needle-shaped crystals are finer and more delicate than in the other samples.

11. The samples from Isparta (Figure 10), Malatya (Figure 11), Yalvaç (Figure 12), Bolvadin (Figure 13) and Beyşehir (Figure 14) are close to the intermediate type. Here, beside a few needle-shaped crystals, there appear fine granular particles.

12. In the Isparta opium the needles are finer and somewhat longer. In the Beyşehir sample they are shorter, and in that from Bolvadin they are very few and resemble rods. In the Malatya opium the crystals are generally fewer, with rods among them here and there.

13. The needles in the Yalvaç opium are longer and somewhat thicker.

14. The sample from Emet (Figure 15) has special characteristics. The whole field is covered with fine, small, well-shaped needles, regularly distributed, and in between them some fine granules appear here and there.

15. To summarize the characteristics we have so far observed: Turkish-grown opiums show not only the single type of crystals mentioned by Fulton, but also two others. In these the crystals are not of rod form but rather needle-shaped. It is thus necessary to recognize each of these samples as of a separate type from his.

/16. If we regard

16. If we regard the Emet opium as a particular type, we may classify Turkish opium thus:

(a) A type consisting of small particles with the crystals irregularly scattered over the field and no crystals of either rod or needle shape. This type corresponds to Fulton's second type.(Figure 1).

(b) (i) A type containing long, fine needles with a small number of irregular particles among them. This type is close to Fulton's first type but the morphology of the crystals is different (Figure 6).

(ii) A type characterized by needle-shaped crystals as in the Emet sample: smaller, well-formed and thickly scattered over the field. A few small particles can be seen among them (Figure 15).

(c) Intermediate. This type is characterized by the presence in the field of view of crystals of both the previous types. The preparations exhibit well-formed needles and irregular particles.(Figure 12).

17. Thus regarded, Turkish opium cannot be classified in a single type, but all the types of crystals we have mentioned in this survey must be borne in mind.

18. We obtained our samples from the places indicated on the map, and those districts have between them no such geographical or climatic relationship as would explain the resemblances or differences in the crystals. These differences found in Turkey may perhaps also exist in other opium-producing countries. As they will not be fully understood until further research has been carried out, this method must be used very cautiously in determining the origin of contraband opium.

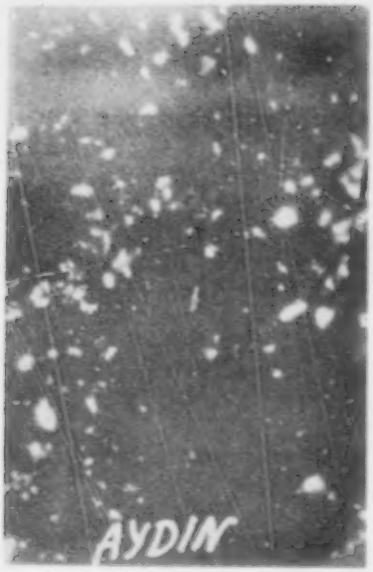

Figure 1

AYDIN

Morphine: 12.50%

Druggist

Irregular crystals of varying size are scattered over the field.

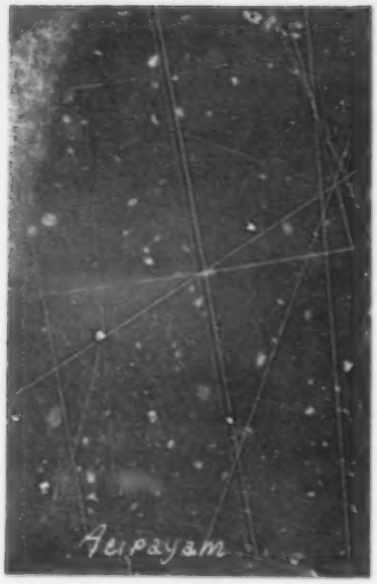

Figure 2

ACIPAYAM

Morphine: 12.50%

Druggist

Smallish crystal particles, scattered, are in the majority

/Figure 3

Figure 3

ÇORUM

Morphine: 13.75%

Soft

Relatively small and scattered particles

Figure 4

INEGÖL

Morphine: 12%

Druggist

A few large, irregular crystals scattered over the field.

/Figure 5

Figure 5

AKHISAR

Morphine: 12.50%

Druggist

Fairly abundant small particles.

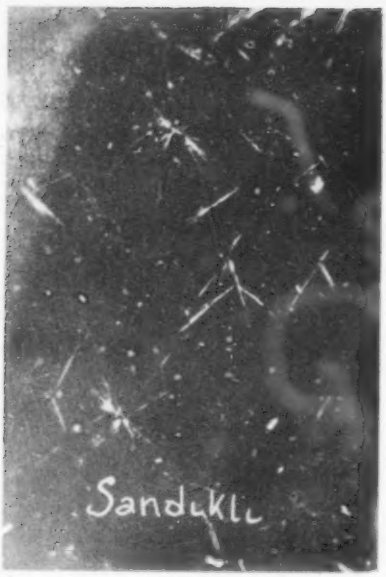

Figure 6

SANDIKLI

Morphine: 10.50%

Druggist

Small particles among long, thin, pointed crystals.

/Figure

Figure 7

ZILE

Morphine: 13%

Soft

Long, blunt-pointed needle-shaped crystals, and irregular particles.

Figure 8

KULA

Morphine: 12.50%

Druggist

A few small particles among thin, fine-pointed needles.

/Figure 9

Figure 9

USAK

Morphine: 13.50%

Druggist

Small particles among long, thin, fine-pointed needles.

Figure 10

ISPARTA

Morphine: 14%

Druggist

Relatively short-thin needles interspersed with small particles.

/Figure 11

Figure 11

MALATYA

Morphine: 9.75%

Soft

One or two small rods, irregular crystals of various sizes and generally of small number.

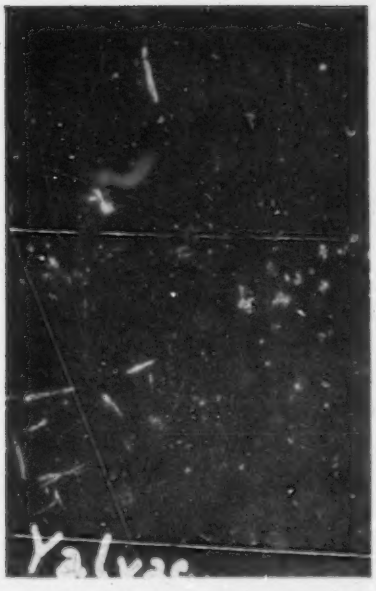

Figure 12

YALVAC

Morphine: 11%

Druggist

A few needles and small crystal particles.

/Figure 13

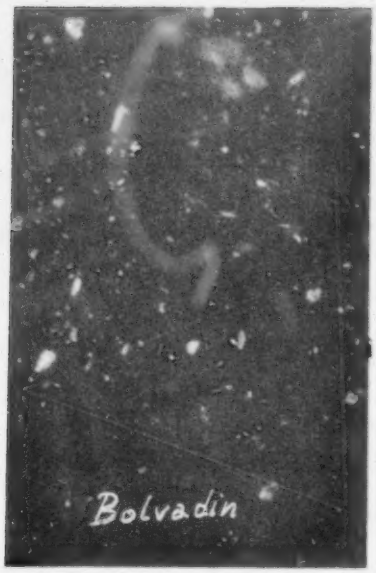

Figure 13

BOLVADIN

Morphine: 12.50%

Druggist

One or two small rods, particles of various sizes.

Figure 14

BEYŞEHIR

Morphine: 12.50%

Druggist

Very small needles interspersed with irregular particles.

/Figure 15

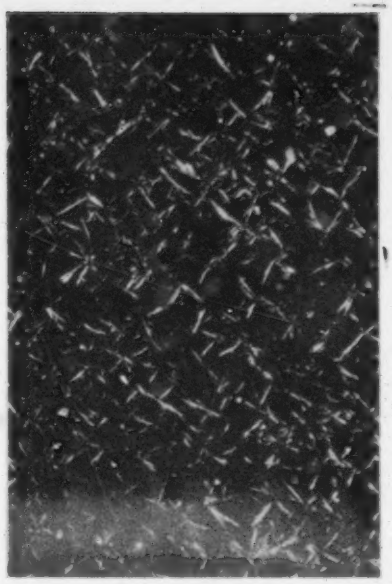

Figure 15

EMET

Morphine: 10%

Druggist

A few small particles among a profusion of small needle crystals.

/MAP

RUSYA
IRAN
IRAK
SURİYE
KARA DENİZ
AK DENİZ
MARMARA DENİZİ
Malatya
Zile
Çorum
ANKARA
Beyşehir
Yalvaç
Isparta
Sandıklı
Uşak
Emet
İnegöl
Kula
Akhisar
Aydın
Acıpayam